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# Worldwide Report

ENVIRONMENTAL QUALITY

No. 309

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## PAKISTAN

### MARINE POLLUTION ASSUMING SERIOUS PROPORTIONS

Karachi MORNING NEWS in English 24 May 81 p 5

[Article by Lionel Andrades]

[Text] Marine pollution through oil spillage and industrial waste is assuming serious proportions, threatening marine life, along Karachi's coastline.

Large oil slicks (6 ft) wide have been noticed in the sea near Maulvi Tamizuddin Road and the NCS building. Natant oil was also seen near the Beach Luxury Hotel and employees of the hotel say this is a common sight.

Daily the tide floats in diesel spilled by the ships at Keamari, and washes it on to the land. Shingles have over them thick-gummy grease and large shining black patches have despoiled part of the coastline near the new bridge.

The Environmental Protection Committee of the KDA meets monthly, it is learned. These oil slicks must be put on the agenda of next month's meeting.

Oil has proven ability to attract and concentrate other pollutants; metals and pesticides. A heavy metal such as mercury causes nervous disorders in people who consume it through fish heavily polluted with this element. A component of oil, a polycyclic hydrocarbon is known to be cancer producing.

#### Oil Slicks

The oil slicks that bob with waves along Karachi's coastline are observable. What is not is toxic substances and lethal chemical waste. Industrial waste unobservable to the human eye but a reality to chemical tests.

The fish for Pakistan's future generations may be a potential killer. If the authorities do not completely deal now with marine pollution through oil spillage and industrial waste, we bequeath to our future generations contaminated fish and mollusks.

Last year a group of scientists studying marine pollution along Karachi's coast, disclosed, thousands of tons of sewage was being spewed daily into the sea. Of this waste 80 percent was industrial produce.

The time is now to take marine pollution seriously. The oil on the surface of the sea is also the surface of a deeper issue; a serious environmental threat. The supply of this protein source may become more objectionable than dog's meat or watered milk.

## Identification

The identification of industrial waste and toxic chemicals and the stipulation of acceptable levels in water is vitally needed now. A Code of Conduct for industrial disposal of waste must be formulated. Simultaneously Government agencies with legal support must observe its implementation.

Personal checks near the factories are needed and water samples near factories and water specimens at the disposal area must be analysed.

The Public Education Committee appointed by the Environmental Protection Committee of the KDA should inform citizens and citizen committees of their legal rights (if any) against the Keamari area polluting industries, and what have been legal precedents.

A broad, innumerable ecology committees and concerned citizens have sued industries that have spewed pollutants into the sea. Industrial compensations paid by companies at fault have run into billions. Not so in Pakistan.

The oil being spilled in the harbour area is now being noticed along the coastline, miles from the source. It is in the interest of hotels along the beach and the tourism department to lobby for Government policies to permit legal action and the prevention of oil slicks.

Effluents discharged into the sea, experts state have rendered the beaches unsafe. They have pushed marine life deeper into the sea. Plankton, the food of fish, has been contaminated, so have mollusks and other delicacies the Karachi sea has to offer.

There is increased industrial activity along the Karachi harbour. And it will continue. There are also pesticides banned in the West, being exported to Pakistan and the Third World nations. These chemicals are channeled through sea lanes near Karachi and stored at the harbour.

With regular spillages over the years, the quality of future marine life is "fish for thought."

CSO: 5500/4528

APPEAL TO COMBAT WATERLOGGING

Karachi MORNING NEWS in English 4 May 81 p 5

[Text] Hyderabad, 3 May--The Chairman, Sind Abadgar Board, Hyderabad, Syed Ali Mir Shah has appealed to President General Mohammad Zia-ul-Haq to direct the concerned authorities to combat the growing menace of waterlogging and salinity on war footing.

He was addressing a Press conference at his bungalow here yesterday on completion of his tour of rural areas (lower in upper) of Sind province.

He said that further delay in combating the twin menace would result in a chaotic condition in rural economy as it would adversely affect the agricultural sector. He said that thousands of acres of fertile agriculture land was being turned into barren land in Sind and the process was continuing.

He regretted that the Federal Government has provided a very negligible amount for the completion of left and right banks outfall drains and the work on Kotri Barrage surface drainage scheme has also suffered due to non-availability of funds.

Speaking about fertilizer, he said that there are growing complaints of adulteration. And shortage of prescribed quantity in bags has also been reported by the agriculturists. These complaints call for the needs of Government's immediate attention, he remarked. He further said that the use of fertilizer was not based on soil conditions which was also adversely affecting per acre yield.

Syed Ali Mir Shah suggested that the Agriculture Department should undertake testing of soil at taluka headquarter level so as to determine what type of fertilizer was suitable for the land.

Speaking about the law and order situation, he said that growing incidents of cattle lifting daylight armed robberies, abduction and burning of harvested crop has created unrest among the cultivators in particular and has adversely affected the agricultural economy. He said that it is feared that some vested interests are out to defame the Government and to destroy the agricultural economy.

He appealed to the law enforcing agencies to take all possible steps to ensure the security of life and property in rural areas.

CSO: 5000/4528

PEOPLE'S REPUBLIC OF CHINA

BOARD MEETING PROPOSES, DISCUSSES NEW ENVIRONMENTAL IDEAS

Beijing GUANGMING RIBAO in Chinese 21 Apr 81 p 2

[Article by Jin Jiacheng [6855 0857 6134]: "Hangzhou Stresses Scientific Research in Its Environmental Protection Work"]

[Text] Zhejiang Provincial and Hangzhou Municipal Environmental Science Societies recently called a joint expanded board meeting to discuss items in the city's construction plan concerning environmental protection. Some important ideas were proposed.

The environmental protection plan of the city emphasizes the protection of the West Lake, the protection of inland streams, and the sources of the city's drinking water. The plan envisions the use of the water of Qiantangjiang to flush the West Lake, the Zhonghe, and the Donghe. Pipes are to be buried along Zhonghe and Donghe so that the waste water of plants and homes along the banks of these streams will no longer be discharged into these streams. At the same time a main drain will be constructed to drain the waste water of these sewer pipes into Qiantangjiang. A drainage pipe encircling the West Lake has been completed. The current work is to see to it that plants and other units discharge their waste into the drainage pipes. After lengthy discussions, representatives at the meeting believed the plan to be basically good but shortcomings were also noted. The major problem remained drawing water for the West Lake. Some questioned the scientific basis of drawing water into the West Lake. They were worried about new destruction of the ecological balance when water is introduced into the lake, especially the possibility of creating the ingressions of sea water into the lake during high tide in Qiantangjiang and the large quantity of Qiantangjiang silt settling onto the lake bottom. For these reasons, a model experiment of the water-drawing project was suggested to study its ecological effects. Some comrades proposed that optimal data with respect to the flow speed of the water introduced, the quantity of the water, and the frequency of water exchange for the lake should be obtained so as to provide scientific bases for the project. Some other comrades proposed that the problem of introducing water did not require consideration at the moment and the related units should first be urged to dispose their waste water into the sewage pipe surrounding the lake. Through strengthened management and other measures, the quality of the lake water should then be tested to see if there is any improvement before considering the problem of introducing water.

Another important problem discussed was that of protecting the water system of Qiantangjiang. Qiantangjiang is the major source of drinking water for the people of Hangzhou and to protect the Qiantangjiang water system is a matter of concern to

the million inhabitants of the city and their descendants. At present, Qiantangjiang is polluted. If most industrial and biotic waste water is to be discharged into Qiantangjiang, how large a waste content can the Qiantangjiang hold, the specialists asked. A scientific assessment should be made first. There should also be studies on the dispersion principle at the Sanbao waste effluence in the lower reaches of Qiantangjiang.

6168  
CSO: 5000/4062

PEOPLE'S REPUBLIC OF CHINA

DILIAN CITY RESOLVES MANY ENVIRONMENTAL PROBLEMS

Beijing GUANGMING RIBAO in Chinese 21 Apr 81 p 2

[Article by Wang Yonghai (3769 3057 3189]: "Strengthening Environmental Work in Dalian"]

[Text] Dalian City is the key area of pollution control within a period of time designated by the State Council. In the work of strengthening environmental protection, Dalian Municipal People's Government first resolved some environmental problems that were serious, very harmful, and disturbing to the people. Some effects can be seen and the appearance of the environment has made a turn for the better.

Last year the city concentrated on pollution of oil, waste water of electroplating, waste residue, waste gas, and noises. On the one hand, observation and monitoring were strengthened to obtain more than 12,300 facts for data to resolve pollution problems scientifically. On the other hand, the management structures were strengthened to establish environmental protection departments in plants that discharged wastes so that special persons could be made responsible for periodical examination and strict management of items under control within a given period of time. By the end of last year, 1,575 boilers in the city had been reconstructed; 156 electroplating plants were dismantled to resolve the problem of electroplating-waste water pollution; notices were given to 58 units to forbid above-quota production at night and 16 units were told to move away or adopt sound barrier measures to reduce noise pollution in residential areas in an effort to create a relatively quiet environment where the masses can live and learn.

For the purpose of resolving environmental problems that were very harmful and disturbing to the people, the city's People's Government fully utilized the function of the Environmental Protection Bureau to adopt environmental legislation and economic means in order to combine management, control, prevention, and penalty and push environmental protection work still further. Beginning last year, the government enacted "The temporary regulation of collecting waste discharge fees," "Regulation for controlling and eliminating noises in the city," "The temporary regulation for protection and management of coastal harbor waters," etc. to implement the environmental laws with force and to strengthen pollution control. The waste discharge fee was especially used as an important means of managing the environment. After fees were collected from more than 1,270 units, the pollutant discharging units began to pay attention. They began to be able to combine the interest of the industry with the work of protecting the environment. Positive measures were adopted at very little expense in order to avoid paying a much higher pollutant discharge fee. Dalian

Steel Mill urged the masses to build an engineering project for treating the acid waste water. The equipment was put in operation in July of last year. It can reclaim 17-20 percent rejuvenated acid amounting to 15,000 tons, as well as 3,400 tons of ferrous sulfate and 170,000 tons of water. The savings are worth more than 500,000 yuan.

6168

CSO: 5000/4062

PEOPLE'S REPUBLIC OF CHINA

EAST CHINA ENVIRONMENTAL PROTECTION CONFERENCE HELD

Beijing GUANGMING RIBAO in Chinese 3 May 81 p 2

[Article by Yang Kaijin [2799 7030 3046]]

[Text] A conference on environmental protection for six provinces and one city of East China took place 7-9 April under the auspices of the Environmental Protection Office of the State Council. The participants exchanged their experience and studied ways to activate in-depth propaganda activities for environmental protection.

The propaganda activities for environmental protection envisaged by the conference are as follows: The various provincial and municipal people's governments must play a more active role; sum up the environmental protection work and commend those units and individuals for their satisfactory work; join together the "five emphases," "four beautifications," and the patriotic health drive in order to make the environmental protection propaganda more extensive and penetrating. The conference decided that the next round of propaganda activities should focus on "The State Council Decision on Strengthening Environmental Protection During the Readjustment of the National Economy" so as to make the propaganda cover both the State Council decision and the environmental protection law. Special emphasis should be placed on the environmental protection policy during the readjustment of the national economy. The essentials are as follows: Prevent the spread of new sources of pollution and stop the construction of all improperly planned industrial projects which waste natural resources and energy and cause uncontrollable environmental pollution; all capital constructions must meet the "three concurrent requirements" just as pollution control must be included in efforts to explore production potentials or the innovation and transformation of an enterprise; all the cities and industrial centers concerned should investigate and analyze the sources of environmental pollution and work out plans to control them according to the degree of urgency. The immediate targets are to control pollution by industries and enterprises located in residential areas, protected areas of water supply and areas of scenic and tourist interest; and publicize effectively the state environmental protection programs and guidelines to get the people's governments at all levels to work for effective pollution control by including the targets, requirements and implementation measures of environmental protection in the plans and programs they formulate for the national economy and social development.

9360

CSO: 5000/4065

PEOPLE'S REPUBLIC OF CHINA

MEASURES URGED TO FORESTALL PROBLEMS BROUGHT BY TOURISM

Beijing HUANJING BAOHU (ENVIRONMENTAL PROTECTION) in Chinese No 1, 1981 pp 20-21

(Article by Ji Bang (2630 27187: "Development of Tourism and Environmental Protection")

Text Although tourism has a history of over 100 years, noteworthy developments have occurred only during the past 10 to 20 years. According to estimates, in 1978 the world's tourists numbered 260 million. The rapid increase in the number of tourists has brought visible economic gain to certain nations and regions. In 1978, Great Britain earned \$7 billion from tourism, and at the same time provided jobs for 1.5 million people. The benefits surpassed the income from the oilfields of the North Sea. Our nation's neighbor, the Philippines, received about 1 million people in 1978 and earned sizable foreign exchange. This has served the development of the island nation greatly. It is commonly believed now that tourism has already become a new active factor in economic development. Therefore tourism has been called the "smokeless industry" and "formless trade."

The newly developed tourism has gradually changed people's understanding of the meaning of resources. In the past, it was generally believed that resources referred to material wealth existing in nature, such well-known resources as forests, mineral deposits, etc. Today, this concept has expanded. We can understand resources as natural units existing in natural or social environments, developed through a definite organization and managed and producing a definite economic gain. Starting from this definition, forests and mineral deposits are resources, manpower and talent are also resources, and all units possessing a value in tourism are also a kind of resource.

Tourism resources cover a broad range, and can be generalized as the following aspects: 1) natural scenery that gives people a good feeling, including natural environments which can provide camping, mountain climbing, fishing, hunting; 2) well-known tourist attractions and ancient ruins of cultural and educational significance and specific humanistic atmosphere; 3) cultural and entertainment activities of unique characteristics, including museums, exhibition halls, sports events, and traditional folk festivals; 4) important economic construction and achievements.

Our nation is extensive. It has many miles of rivers and mountains and many places of beautiful scenery. Hangzhou, Guilin, Lushan, Qingdao are already known. There are many cultural ruins such as the Great Wall and the stone caves of Dunhuang

which are known throughout the world. Many overseas tourists want to look at them. Even the large grasslands in Neimenggu and the Gobi in Xinjiang provide unique scenes. After liberation, some of our nation's economic achievements have also been of interest to some tourists. Therefore, our nation's tourism resources are also as rich as other natural resources and they have a broad future for exploitation.

But developing tourism resources is like developing other natural resources; it is accompanied by pollution problems. As mentioned before, in 1970 the world's tourists numbered over 200 million. Of course not all of them were concentrated in one place at the same time, but as a whole, this signifies that on the surface of the earth, an average of over 500,000 people are moving about every day. Just looking at the transportation required for this many people, vehicles and planes traveling back and forth, great pressure is levied upon the environment. In recent years, the global pollution problems cannot be regarded as unrelated to the rise of tourism. Viewing the local regions, environmental problems created by tourism are also outstanding. Our nation's famous place of beautiful scenery, Lushan, reportedly has a daily traffic of 2,100 large and small vehicles passing through. The exhaust from the vehicles seriously pollutes the air and has caused trees along the side of the road to wilt and yellow. At the same time, the noise of the vehicles has also destroyed the originally quiet natural environment. The increase in the number of tourists requires corresponding living and entertainment facilities. Therefore, if the distribution of buildings and waste from living activities are not handled properly, this will also cause damage to the environment. At present, some units have opened up tourism areas at reservoirs or water sources, but the polluted water from living activities has not been treated and is directly drained into the bodies of water. If this problem is not corrected in time, it will cause adverse effects.

At present, our nation's tourism is still at the beginning stage; it can be described as just unfolding. Because of this, environmental protection work must be carried out in time before tourism develops so as to prevent disasters. The important problem is to overcome the unilateral view of seeking profits but disregarding the importance of environmental protection. For this it is suggested: (1) For the scenic tourist attractions already opened up, the environmental protection departments should join with concerned units to organize a force to survey and evaluate the environmental quality for tourism and the capacity for tourists to establish an appropriate rule for tourist acceptance and corresponding measures of environmental protection. At the same time, environmental monitoring stations should be established at key tourism regions. Tourism units should accept supervision by the environmental protection departments. (2) According to stipulations of Article 6 of the "Environmental Protection Law of the People's Republic of China (Trial Implementation)," when opening up new tourism in the future, the sponsoring units must also obey the principle of "three simultaneously," propose reports on the effects of tourism upon the environment, and the regions can do business and accept tourists only after the reports are reviewed and approved by the environmental protection department. (3) Regions zoned by the state for protecting nature should not serve tourism. Such regions which have already established tourism should not be further developed and should be ordered to eliminate tourism within a set date. (4) To protect biological resources, categories of tourism centered around hunting and fishing should not be developed. Important water sources, river segments, mountains and forests should be strictly controlled.

In scenic regions already developed, during important seasons of reproduction and propagation of living beings and migration, the number of tourists should also be appropriately controlled to avoid hindering the development of biological resources. (5) Environmental departments at each level should propose environmental plans for their local regions which can serve as tourist attractions for the tourism industry to select so that economic gain and environmental protection can be unified.

9296  
CSO: 5000/4056

PEOPLE'S REPUBLIC OF CHINA

PRC URGED TO EXERCISE UNIFIED MANAGEMENT OF RESOURCES

OW191121 Beijing XINHUA Domestic Service in Chinese 1231 GMT 18 May 81

[Excerpts] Beijing, 18 May (XINHUA)--Ma Shijun, Lu Baolin, Liu Jiankang and Xiong Yi, members of the Scientific Council of the Chinese Academy of Sciences, proposed that the state exercise unified management of the exploitation and utilization of natural resources and strengthen comprehensive scientific studies of the ecosystem so as to effectively maintain the ecological balance.

They made the proposal at the fourth session of the Scientific Council of the Chinese Academy of Sciences.

They proposed:

1. That the State Council set up a natural resources management commission, responsible for overall planning on large-area exploitation and utilization of land, rivers, lakes and seas, wild animal and plant resources and mineral resources, and promulgate and enforce a natural resources management law to put an end to the present state of administrative confusion with each department forming a system of its own;
2. That the State Scientific and Technological Commission strengthen coordination and administration of the state's major scientific research projects and eliminate the present drawbacks of scatteredness and repetition of scientific research subjects, lack of communications and the resultant waste in scientific manpower and funds;
3. That the Chinese Academy of Sciences set up a comprehensive scientific department (group), responsible for the planning, designing, examination and organization of the development of multiple-discipline studies; and
4. That the State Scientific and Technological Commission, the State Agricultural Commission, the Ministry of Education and the Chinese Academy of Sciences strengthen research and teaching work in the field of ecology, set up an ecological commission, design and coordinate in a well-planned way research on our country's agriculture, forestry, animal husbandry and water area ecosystem, draw up plans on protected natural areas, set up ecological specialties in key universities and colleges to train competent personnel, and so forth.

CSO: 5000/4070

PEOPLE'S REPUBLIC OF CHINA

HEAT RECYCLING PROJECT USES ELECTRIC POWER PLANT'S WATER

Beijing GUANGMING RIBAO in Chinese 3 May 81 p 2

[Article by Lu Xiaochen [7627 2556 2525]]

[Text] By circulating water from the electric power plant for heating, the city of Shenyang conserves energy, brings comfort to its residents and reduces urban environmental pollution.

The electric power plant in the Tiexi District of Shenyang used to cool its circulating water by forcing it through a water cooling tower where the heat escaped into the atmosphere. The nearby business units and residents, however, had to install large numbers of furnaces for heating in winter. These scattered furnaces were inefficient thereby wasting fuel and polluting the environment. To improve environmental quality, conserve fuel and do away with what is harmful, the state approved last year the construction of a heat recycling project in the Shenyang electric power plant to transmit heat through vacuum circulation to the community. When the first stage construction was completed last year, the power plant was able to send its circulating hot water at 75°C to an area of 1 million square meters with more than 20,000 households in the Workers Villa of the Tiexi District. The heat was good enough to replace over 100 furnaces.

During the peak heating season between winter and spring, the circulating hot water provided by the power plant saved the state about 50,000 tons of raw coal, equivalent to 20 percent of the coal saved last year by the city of Shenyang. It also saved 2 million kilowatts of electricity, 310,000 ton/km of transportation power and over 3,000 tons of oil. The shipment of a no longer needed consignment of furnaces was called off, thus the provincial government saved a tremendous amount in the labor force. The coal consumption per kilowatt at the Shenyang Power Plant is also down from 450 kg to 380 kg. When the entire project is completed, it would heat an area of 2 million square meters. The heat utilization rate will go up from 38 percent to 87 percent. The investment in the project will be paid back in 2 years.

A360

CSO: 5000/4065

PEOPLE'S REPUBLIC OF CHINA

AUTOMATIC ARSENIC ANALYZER FOR WATER QUALITY DEVELOPED

Beijing HUANJING BAOHU ENVIRONMENTAL PROTECTION in Chinese No 1, 1981 p 13

/Article by Sun Shirong /1327 0013 2837/: "Our Nation Successfully Develops An Automatic Arsenic Analyzer"

/Text/ Recently, the Chanchun Applied Chemistry Institute of the Chinese Academy of Sciences and the Shanghai Analysis Instruments Plant successfully developed an automatic arsenic analyzer for our nation's first water quality monitoring ship "Chang Qing" to sail the Changjiang. After evaluation by concerned departments, it is believed to be a highly sensitive instrument with good repetitive ability; the operation is simple and the process is rational. It was successfully applied in the monitoring and measurement of trace amounts of arsenic in ground surface water. After over half a year of trial use, its function has been shown to be good.

This automatic arsenic analyzer monitors the content of arsenic in water on the basis of the principle of colorimetric analysis. The main components are a chemical analysis device, a procedure control unit, a photoelectric circuit system and measuring circuits. The instrument uses diethyl amino dithio silver formate colorimetry to determine arsenic, and it uses solid boron potassium hydride containing sodium chloride thinner as the reducing agent to replace the commonly used reducing agents of zinc and pure boron hydrides. The use of this type of reducing agent shortens the cycle of determination. The instrument is simple in structure and it does not need extra carrier gas and mixing units. The instrument has a rational process and automated analyzing unit for the automatic analysis of arsenic for good performance. The measuring part uses a single light channel and singular receiver unit and a rotary light filter optical system based on the principle of double wavelength colorimetry as well as monocolorimetric utensil colorimetry. This lowers the lower limit of the measurements and increases the repetitiveness of the measurements.

The instrument has automatic sample adding functions, automatic adding of reagents, drainage of liquids and a washing function. It can be operated manually, semi-automatically. The operating procedure of the instrument displays the measurements by light on the analog diagram on the surface board so that the operator can have a direct view and gain direct understanding. The final result of the content (ppb) of arsenic in the water is directly displayed numerically and the recorder records the result automatically at the same time.

The major function of the instrument has reached and surpassed the originally designed requirement. The range of measurement of the instrument is 5-100 ppb. The standard values of arsenic in ground surface water and drinking water are all within the measuring range of the instrument. The lower limit of the measurement of the instrument is 5 ppb. This value is lower than the flame atomization absorption method and even lower than the atomization absorption method of the graphite furnace that directly takes in samples. The flow of the main part of the Changjiang River is large. Pollutants are quickly diluted, and the content of arsenic generally is lower than the standards of ground surface water. The instrument may still detect concentrations of lower than 5 ppb, and it may still be used to estimate the half quantity of change of arsenic.

9296

CSO: 5000/4058

PEOPLE'S REPUBLIC OF CHINA

WATER PROTECTION ALONG BANKS OF LARGE RIVERS URGED

Beijing HUANJING BAOHU (ENVIRONMENTAL PROTECTION) in Chinese No 1, 1981 pp 14-16

(Article by Jin Chuanliang (6855 0278 5328): "Protect the Bodies of Water Along Major Rivers")

(Text) Along the two banks of our nation's largest river, the Changjiang, industries and cities have rapidly emerged and pollution of water quality has become more and more serious. Each day, the river receives over 26 million tons of polluted water from the industries and cities in the river valley. Although the natural flow in the main stream of the Changjiang is 100 times that of the total amount of drained polluted water so that the polluting substances are diluted and purified, nevertheless, during dry seasons the length of polluted water along the banks still constitutes about one-fourth the total length of the river east of Dukou. Especially in the water regions near key industrial cities, pollution is even more serious, forming pollution belts several dozen kilometers long and causing damage to fishery, industrial and agricultural production and the water supply to cities and towns. Similar situations also occur in other larger rivers. How to protect the water quality of large rivers has become a subject that needs to be solved urgently.

Implementing "Zero Discharge" and "total protection of the cross-section"

At one time there were two views concerning protection of the water quality of rivers. The first view required the polluting source (factory enterprises, cities and towns) to implement zero discharge. This view held that the rivers can keep their clean state only when the polluting source stops discharging waste into the rivers. Actually, such a requirement is irrational and impractical. The river itself has a certain ability to purify itself. Since ancient times, the river has always shouldered the responsibility of transporting and purifying wastes, only in the past the amount of waste was small, not enough to cause serious pollution. The self-cleansing ability is also a kind of resource and it should be properly utilized. Because this type of resource under definite conditions is very limited, it can be rationally utilized only under the assurances of strict control and management measures. Rational utilization of the self-cleansing ability of bodies of water is beneficial to conserving the cost of control and to promoting the control of the source of pollution. Although implementing zero discharge is a good aim and in individual professions it can be done, as a common requirement it cannot be realized. For example, in 1972, the United States drew up a federal pollution control law requiring that the pollutants be reduced to zero by 1985. For this, \$10 billion was spent

during the first 3 years. But because it was too costly, opposition to the requirement of zero pollutants arose. Therefore, in the near future in our nation, implementing zero discharge is not possible. On the other hand, natural bodies of water themselves contain various elements of a definite content which are necessary and beneficial to living matter and the human body. Therefore, the basic purpose of preventing pollution is to hold the various elements below the allowable standard.

The second view proposes the use of the average concentration of the water quality of the entire cross-section of the river for evaluation and for protection. This method is suitable for small branches and small rivers, but it is not suitable for guiding protection of water sources of large rivers. We can take the Changjiang as an example for explanation. The Changjiang's main flow has an annual average ratio of flow to pollution (the ratio of the amount of flow to the amount of polluted water entering the river) of more than 100 to 1; the water quality inspection value (indicating pollutants and poisonous substances) of the deep and broad flow in the center is basically "undetermined," but in fact, the effects of pollution along the river causing damage are still relatively serious, especially the damage to aquatic resources. According to statistics, aquatic production dropped by 45 percent from 1959 to 1975. In some cities, the quality of the water supply declined. Using the average value of the entire cross-section will not easily explain clearly the present situation of pollution of Changjiang. Also, if the inspection value of the pollutants of the deep and broad flow in the center approaches or reaches the water quality standard of the ground surface, or the average concentration reaches the water quality standards of the ground surface, then is it easy to imagine the polluted situation of the Changjiang? This method is not suitable for evaluating water quality and pollution of large rivers, and the protection of water sources should not take this as reference.

#### Water Regions Along the Banks Must Be Protected

The problem of water pollution means harmful and poisonous substances in the water environment have reached a definite content causing harm to physical health, economic development and the ecological systems of aquatic life. Therefore, we must start out from this point in the study of protecting water sources. The proposal to "protect the water regions along the banks" is based on the principle of combining prevention and control, taking into consideration human production and the position of water for living and safety of the aquatic ecological system centered around fish. Taking the protection of water regions along the banks as the goal of protecting large rivers is mainly determined by the following objective factors:

1. Water regions along banks are the major regions of water used by man for his economic and living activities. Whether it is a city's water source or water for industrial use or for agricultural irrigation, the water is mostly taken directly from water along the banks.
2. Fish and most of the aquatic life that have economic value all use the shallow water regions along the banks as the major activity grounds (living, seeking food, reproduction). In particular, in the shallow water regions along banks near the confluence of small rivers and estuaries, because of the rich sources of food, fish activities are more prosperous.

3. Polluted and waste water of cities and industries is mostly untreated and directly flows into the rivers from the banks or is carried by small rivers into the large rivers, thus seriously threatening the safety of water used by man and the existence of fish and such aquatic life.

4. In large rivers, the hydrological conditions in the water regions along the banks are frequently unfavorable to transverse dispersion of pollutants. The pollutants extend in the direction of flow within a definite area along the banks, forming a visible belt of pollutants. This is not only true in bodies of water but in the distribution of pollutants in sediments on riverbeds, the pollutants move downstream along the side of the bank from which the pollutants came.

5. On the basis of zoning the regions of protection of bodies of water along the banks, evaluation of water quality can be carried out. This will more accurately reflect the actual distribution of pollution of the water quality in the large rivers and the effects and damage caused. From this, a scientific basis can be proposed for controlling pollution and managing the water quality of rivers.

At present, the problem of pollution in large rivers is actually the problem of pollution of the banks that destroys the quality of water for economic use. Because the areas of water for economic use are basically water regions near the banks, therefore protecting the water regions along the banks has direct and practical significance to assuring the normal economic life of people and developing aquatic production. Also, as long as the water regions along the banks are protected well, the water quality of the entire river can basically be maintained in a good state. Therefore, protection of the water regions along the banks is a measure taking prevention as the main effort and is the key to protecting large rivers.

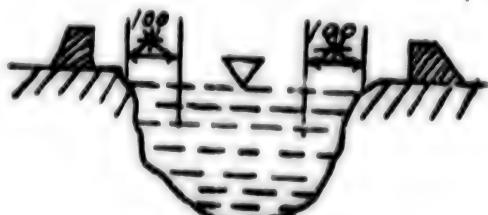
#### Zoning of Protective Zones of Water Along Banks

How large should a river be for consideration of zoning protective zones of water along banks? Because the hydrological conditions of each river are different, it is very difficult to establish a uniform standard. But preliminarily we believe that by taking the width and depth of the river into consideration and based on the situation of pollution of our nation's rivers, all rivers deeper than 5 meters and as wide as 400 meters with massive amounts of polluted water nearby being drained into them should generally have an established protective zone for water along banks. Larger lakes and reservoirs should also be included in considerations to establish protective zones for water along banks.

The width of the protective zones of water along banks should be determined by the actual situation of the water regions. According to information on the pollution belts formed along banks of some large rivers, information on the major activity range of fish in the shallow water regions along banks and related water quality standards for ground surface water, reference is made to Article 14 of the "sanitary standards for water used for living and drinking" which states: "Anchoring boats, swimming, fishing and netting and all activities that may possibly pollute the water source are prohibited within a water region surrounding the point where water is being taken for use; the region shall cover an area no less than 100 meters in diameter from that point, and visible signs are to be posted to mark out the area." According to the following two situations, opinions on preliminary zoning have been proposed:

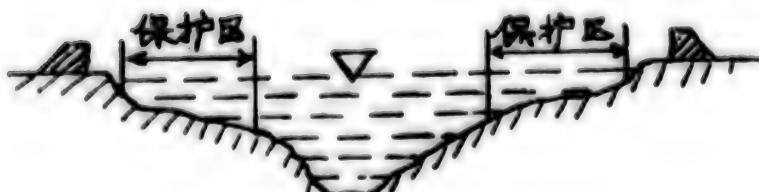
(1) In rivers with more precipitous banks extending to the riverbed and the depth of the water along the banks is greater than 2 meters, the width of the protective zone of water along the banks can follow the above principle and rule and can be temporarily set at 100 meters (see Figure 1).

(2) Water regions along river banks where the beach of the river is wide, and beachhead is constantly submerged and the depth of the water averages 2 meters, banks where fish reproduce, live and seek food and where such activity is prosperous, to protect aquatic resources, the width of the beach of the river should be taken as the width of the protective zone of water along banks (see Figure 2).



(示意图 I)

Figure 1. 10 meters



(示意图 II)

Figure 2. Protected zone

#### Management of the Protective Zones of Water Along Banks of Rivers

After the protective zones of water along banks have been determined, the allowable load of pollutants within the protective zones of water along banks should be calculated from related water quality standards, the natural contents of the water of the water region, tests and computations of the self-cleansing ability and the mutual relationship between water quality and water quantity. Then, demands can be placed upon the source of pollution to limit the amount of waste released (including the total amount of polluted water released by the polluting source, concentration of the waste water released and the method of release of waste). The pollutants

that are prohibited from being released should be eliminated by the unit producing the pollutants via measures of control. Disguised means of releasing such pollutants into the surrounding environment cannot be allowed. The unit and its leadership should be responsible for releasing more waste than is allowed and for causing pollution and damage. Water resources protection and management agencies and local environmental protection departments have the authority to inspect and supervise and to propose opinions according to the national environmental protection laws and related laws and when necessary they can bring the matter to court so that protection of rivers and water sources has a legal base and rules to follow and can be effective.

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PEOPLE'S REPUBLIC OF CHINA

SUPERPURE HYDROGEN GENERATOR PUT IN PRODUCTION

Beijing HUANJING BAOHU ENVIRONMENTAL PROTECTION in Chinese No 1, 1981 p 16

Article by Xie Dong [6200 26397: "New Equipment To Replace the Hydrogen Bottle--Superpure Hydrogen"]

Text Generator Officially Enters Into Production

In the work of monitoring the environment, frequently superpure hydrogen is used as the carrier gas or fuel for analyzing pollutants in the atmosphere. The superpure hydrogen generator uses the alloy material of the precious metal palladium and silver as the cathode and uses nickel as the anode in electrolysis of water to produce highly pure hydrogen gas and release oxygen. Here, the main thing is the active surface of the palladium cathode. It is the key to the production of hydrogen, absorption of hydrogen and permeation of hydrogen.

In 1976, our nation's Beijing city organized efforts to produce equipment to monitor atmospheric pollution, and several units cooperated and jointly developed this superpure hydrogen generator prototype successfully. But because the technology was relatively complex, mass production was difficult. Recently, the Beijing Zaoyang Machinery Plant (now renamed the Beijing First Printing Machinery Plant) testproduced the generator successfully under the guidance and with the cooperation of the Chemistry Institute of the Chinese Academy of Sciences. Users of the several dozen units of superpure hydrogen generators have proven that the generator functions well, is reliable and stable, and has reached the demands of the original design. In November 1980, the Beijing Environmental Protection Bureau held a technical evaluation meeting. The meeting determined that the DCH-1 model superpure hydrogen generator testproduced by that plant was of advanced levels in the nation. After onsite testing, the generator reached the various indicators listed in its technical performance standards and it possessed unique characteristics in our nation. In certain functions, it has reached the same level as similar foreign products. The generator has a compact structure, is easy to carry, has a stable flow, has good airtight qualities, the output of hydrogen surpasses the original designed level, it has a good resistance to shock, and operates safely. The purity of the hydrogen gas was determined by the Chemistry Institute of the Chinese Academy of Sciences as reaching 99.9999 percent. The generator satisfies the requirements of gas phase chromatography and also serves as a source for small amounts of hydrogen gas. The evaluation meeting considered the design of the generator rational, the technical indicators advanced, the information complete, and that it could be entered into production. The meeting also expressed the hope that the varieties could be expanded to satisfy the demands of different users.

This breakthrough in the production of superpure hydrogen technology in our nation has provided a very convenient condition for environmental monitoring work in large and small cities.

This type of superpure hydrogen generator is needed not only in environmental monitoring work, but also in other professions such as chemical analysis, electronics, metallurgy, scientific research and national defense. It is an important basic equipment, and has filled a void in our nation's instruments and equipment.

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PEOPLE'S REPUBLIC OF CHINA

HIGH RATE OF CANCER AT NANJING UNIVERSITY STUDIED

Beijing HUANJING BAOHU ENVIRONMENTAL PROTECTION in Chinese No 1, 1981 pp 37-38, 43

Article by Chen Xiangyou [7115 4382 0645], Li Fang [2621 5364], and Qiu Jiakui [5941 1367 1145]: "Why Does Nanjing University Have a Higher Percentage of Cancer?"

Text 1. Cancer and Death Rate at Nanjing University

1. Cancer of Each of the Units of Nanjing University from 1964 to 1979.

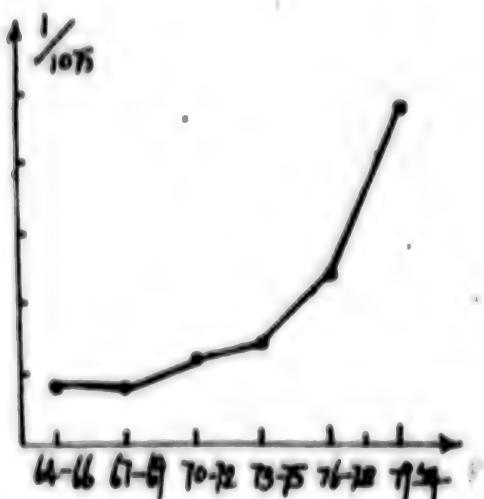
From 1964 to the end of 1979, among 3,284 teachers, staff and workers, 60 had cancer and 41 died. The Chemistry Department, Biology Department, Astronomy Department, History Department, Administration Office and Physical Education Office, totaling 6 units, had a total of 730 persons, constituting 22.2 percent of the total number of people of the entire school, but the number of cancer patients constituted 50 percent of the total number of cancer patients of the entire school, and the death toll due to cancer constituted 51.2 percent of the entire school. The cause of cancer of members of the Astronomy Department, History Department and Physical Education Office is still being sought, but the cause of death in the case of all of the 9 deaths of the Chemistry Department over the 16 years was due to cancer. The percentage of cancer patients and the death rate among teachers and staff and workers of the Administrative Office and the Biology Department were also very high. This is related to frequent contact with poisonous objects.

2. Statistics of Various Cancer Diseases of Nanjing University

From 1964 to the end of 1979, among the teachers, staff and workers of Nanjing University, the percentage of cancer of the digestive system, the stomach, esophagus, intestine, rectum, pancreas and gall bladder, and the death rate were relatively high, constituting 31.6 percent of all cases of cancer and 31.4 percent of all deaths due to cancer. If cases of cancer of the liver are included, the percentages become 48.3 and 53.1.

3. Age Distribution of Deaths Among Teachers, Staff and Workers of Nanjing University

According to surveys, middle-aged teachers, staff and workers (30 to 59 years old) of Nanjing University suffering from cancer constituted 66.6 percent of the total of the entire school. Those dying of cancer constituted 57.1 percent of the school's total, those dying of other causes constituted only 28.6 percent of the total of the school who died from other causes [Big]. The statistics for the city of Nanjing also showed that cancer posed a greater threat to adults over 30 years of age.



附录 1 1964—1976癌病死亡率1/10万

Figure 1 Death rate of cancer patients 1/100,000 1964-1976

1. 1/100,000

2. Year

1

(1) 死亡病因	率(5)	其它非癌 (6)	循环系 (7)	呼吸系 (8)	传染病 (9)
南京大学的死亡平均年龄(岁)(2)	57.0	61.8	61.8	—	61.0
南京市30岁以上居民死亡的平均年龄(岁)(3)	61.6	64.3	69.5	72.6	61.8
南京大学教职工比南京市居民早死(年)(4)	4.6	6.5	7.7	—	0.8

Table 1

1. Cause of death  
 2. Average age at death of teachers,  
     staff members and workers of  
     Nanjing University (age)  
 3. Average age at death of residents  
     in Nanjing city over 30 years old  
     (age)  
 4. Teachers, staff members and workers of  
     Nanjing University die earlier than  
     Nanjing city residents by (years)  
 5. Cancer  
 6. Diseases other than cancer  
 7. Diseases of the circulatory system  
 8. Diseases of the respiratory system  
 9. Infectious disease

4. The Number of Deaths Due to Cancer Increased Year After Year at Nanjing University

#### 4. The Number of Deaths Due to Cancer Increased Year After Year at Nanjing University

Over the past 15 years at Nanjing University, the number of deaths due to cancer among teachers, staff and workers increased year after year. In 1978 and 1979, the death rate to cancer was 243.6/100,000, six times the 40.6/100,000 during 1964-1969 (average), (see Figure 1).

If we look at the number of deaths due to cancer as a percentage of the total number of deaths, the number increased from 40 percent during 1964-66 to 50 percent during 1976-78, while in 1979 it reached 61.5 percent.

#### 5. Sex Ratio of the Death Rate Due to Cancer at Nanjing University

From 1970 to 1979, the annual average death rate due to cancer was 100.5/100,000. The percentage by sex showed males constituted 104.2/100,000 and females constituted 91.8/100,000. The ratio of male to female deaths due to cancer was 1.13.

The number of deaths of male teachers, staff members and workers due to cancer constituted 45.3 percent of the total number of male deaths, and for females this was 64.3 percent.

#### 6. Female Teachers, Staff Members and Workers Die Earlier than Male Teachers, Staff Members and Workers at Nanjing University

From 1964 to 1979, the average age of death of teachers, staff workers and workers at Nanjing University was 58.3, the average age of death of males was 60.0, and the average age of death of females was 50.3. Cancer patients died even earlier. The total average age of death due to cancer was 54.2, the average for males was 56.9, the average for females was only 45.8.

#### 7. Teachers, Staff Members and Workers of Nanjing University Die Earlier Than Residents of Nanjing City Over 30 Years Old

The comparison of the ages of teachers, staff members and workers of Nanjing University and residents of Nanjing city over 30 years old from 1976 to 1979 is shown in Table 1.

It can be seen from the table that the average age of death among teachers, staff members and workers of Nanjing University is lower than the average age of death among residents of Nanjing city over 30 years old.

### II. Preliminary Analysis of the Causes of a Higher Cancer Rate at Nanjing University

#### 1. Cancer of the Liver is Related to Hepatitis

Everyone knows that among cases of primary cancer of the liver, 60-90 percent are accompanied by hardening of the liver (mainly tubercle type), and tubercle type hardening of the liver occurs after viral hepatitis. Of the 10 patients of cancer of the liver discovered in our survey, 7 had a history of hepatitis, and 4 of the 7 had hardening of the liver. Therefore, the higher percentage of cancer of the liver at our school is related to our school's infectious viral hepatitis. The higher percentage of hepatitis in turn cannot be separated from the quality of the health of our school's teachers, staff members and workers.

#### 2. Lung Cancer Is Related to Smoking

According to statistics, lung cancer is the second major killer at our school. Of seven lung cancer patients, six smoke and one does not smoke but has a history of tuberculosis.

Everyone knows that tobacco leaves contain tobacco tar and nicotine, and tobacco tar contains many types of carcinogenic substances, such as 3-4 benzopyrene, arsenic, cadmium, nitrous amine, nickel tetracarboxide. These substances are absorbed into the lungs over a long period and they spread throughout the body, causing the epithelial cells of the bronchi to increase, and the change becomes more and more serious until canceration. The cause and effect of smoking and lung cancer have already been proven by earlier scientific experiments. For example, smearing tobacco tar on the skin of small white mice and rabbits and similar animals for long periods will induce skin cancer. The use of dogs in smoking experiments shows that localized epithelioma of the bronchi occurs.

### 3. The Digestive System Is Related to Pollution of Water, Drinks and Food

Cancer of the digestive system constitutes a large proportion in Nanjing city, Nanjing University and Jiangsu Province. The occurrence of such cancers is increasing year after year. It may be directly related to pollution of drinking water and food. Because of the massive use of farm chemicals in recent years, the accumulation of remnant poison from farm chemicals in food and nitrous acid salts has increased. In addition, improper storage of food will also cause pollution; parasites of yellow mildew and certain additives and coloring agents and preservatives used in food processing also are carcinogenic substances. These substances can cause cancer in the digestive system.

### 4. Nanjing University Has Five Cases of Blood Cancer (Leukemia, Lupus), Ranking Third Among the Various Cancer Diseases of the Entire School

Two members of the Chemistry Department died of blood cancer. Blood cancer has a hereditary factor, but it is also related to environmental pollution and poisoning by chemicals and medicines. At present, over 1,000 kinds of chemicals and medicines are known to be related to the occurrence of cancers. For example, benzene can cause leukemia. It is very easy for chemical workers to come into contact with benzene frequently. Especially with outdated equipment and where protection is poor, the use of benzene will easily cause harm, so the percentage of blood cancer in the Chemistry Department is higher.

### 5. Nanjing Is a City With Developed Industries and it is also one of our Nation's Important Cities of the Chemical Industry

According to statistics of 1976, there were 450 factories above the administrative level of the municipal ward. The average density of factories was 3.1-16 factories per square kilometer. The industrial fuel of the municipal wards was mainly coal, followed by petroleum, and coal gas for coking furnaces. Consumption of coal for industrial use was over 210,000 tons a year. Residents used Nanjing coal with a sulphur content of about 3 percent, much higher than the 0.86 percent sulphur content of Datong coal. The amount of ash was 30-40 percent. The city wards used 370,000 tons of oil a year, and the amount of industrial coal gas for coking furnaces was 20 million cubic meters a year. There were 724 kilns and boilers, but only 25 percent eliminated smoke and dust; the others emitted smoke and dust directly without treatment. In addition, the number of motor vehicles in 1976 was an increase of 4.7 times over 1969.

According to the survey of the five types of major poisonous substances in the atmosphere of Nanjing city conducted from 11 to 15 August, the daily average concentration of carbon monoxide in the city was 1.5 to 2.1 mg/m<sup>3</sup>, surpassing the national standard by 100 percent. The daily average concentration of floating dust was 0.13-0.30 mg/m<sup>3</sup>, with 60 percent surpassing the national standard. In 1976, the daily average of floating dust measured atop our school's physics building reached 0.34 mg/m<sup>3</sup>, and in the city SO<sub>2</sub>, NO<sub>x</sub> and 3-4 benzopyrene were all measured.

Nanjing University is constantly surrounded by thick smoke exhaust from Gulou Hospital. A chemical plant and an electrical engineering plant were built on the grounds of the dormitories. The campus has been polluted by poisonous chemical substances and noise for a long time. These all may have caused the percentage of cancer at Nanjing University to be higher.

### III. Conclusion

After this preliminary survey of cancer among the teachers, staff members and workers of Nanjing University, it was discovered that the death rate due to cancer led all other causes of death at Nanjing University, followed by diseases of the circulatory system, similar to the Shanghai Normal University. The percentage of cancer and the death rate both increased year after year, and the increases were much greater than those at Shanghai Normal University. The location of cancer was mostly in the liver, followed by lung cancer. The average age of the deceased, whether they died from various diseases or from cancer, was lower than the average age of death of adults in Nanjing city. By sex, in general, the females have a longer life than males (including Jiangsu Province, Nanjing city) but the opposite was true at Nanjing University, where females died earlier than males. Cancer among students has continued to occur in recent years and some have died, but they are not included in the study.

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PEOPLE'S REPUBLIC OF CHINA

MEASURES TO PROTECT FISHERY RESOURCES EMPHASIZED

Beijing HUANJING BAOHU (ENVIRONMENTAL PROTECTION) in Chinese No 1 1981 pp 11-13

Article by Zhang Guanzhong (T728 7070 18137): "Where Have the Fish Gone?"

Text There is a definite mutual adaptation and self-regulatory ability between fishery resources and environmental conditions in bodies of water to maintain a dynamic balance of the ecological systems. But when the environmental conditions undergo major changes beyond certain limits, the fishery resources will be adversely affected.

Fishery Resources Seriously Destroyed

Our nation faces the sea on the south and the east. The coastline is over 18,000 kilometers long, and there are some 1.5 million square kilometers of continental shelf fishery zones within a depth of 200 meters. The area of shallow seas and beaches is close to 100 million mu. According to incomplete statistics, the area suitable for sea water fish culture is about 7.4 million mu. The area of inland waters is about 300 million mu. Besides the Changjiang, Huanghe, Heilongjiang and Zhujiang river systems, there are also more than 2,800 large and medium-sized lakes and inland seas as well as countless reservoirs and ponds. Those suitable for culture cover about 75 million mu. The fishery resources are relatively rich. According to preliminary surveys, there are over 2,300 species of sea water and fresh water fish. The more frequently seen are economic fish species, over 100 species of sea water fish, 40 to 50 species of fresh water fish, and several dozen species of shellfish and algae. Superior natural environmental conditions and rich fishery resources are good material foundations for developing fishery production. But for a long time, because man's productive activities went against the objective natural patterns, fishery environments were seriously destroyed, causing drastic degeneration of fishery resources and changes in schools of fish in the fishing zones. Some zones have become unsalvageable, as concretely manifested in the following aspects.

1. Blind encirclement of the sea to create fields, building fields on the embouchure layer, changing beaches along the seacoast and the environmental factors of the mouths of rivers to the sea—all these have affected the growth of certain shellfish and algae; large bases for fry and sea water culture along with many spawning areas of fish and shrimp have been destroyed. According to incomplete statistics, over 1 million mu of beaches along the seacoast traditionally for fish culture have been encircled for farmland.

The precious lancelet unique to our nation is between a vertebrate and an invertebrate and is the ancestor of fish. It has important significance in taxonomy. The lancelet is suited for living in shallow sea water and beaches where there are shells, sand and gravel. The coast of Xiamen city in Fujian Province produces a lot of lancelet. Because the Xinglinwan construction project to reclaim the sea has caused silting, the silt has continuously covered up the layer of sand, destroying the ecological and environmental conditions of the lancelet. The resources have visibly dwindled. The yield dropped from 115,000 jin in 1956 to 4,700 jin in 1969. At present, the lancelet is almost extinct, and irreparable damage has been caused.

2. In building water conservancy projects, blocking rivers and building dams, corresponding passages for fish have not been built. This stops the migratory passage of fish and also destroys the environmental conditions of natural spawning grounds of certain species of fish. These are the major reasons for the drastic decline of fresh water fishery resources, especially migratory and semimigratory fish resources.

The Changjiang River valley is our nation's richest fresh water fishery resource. Since the founding of the nation, several thousand large and small culverts and floodgates have been built along the river, but only very few have passages for fish. Along the entire river valley, there are over 50 lakes covering over 100,000 mu. Except for Boyanghu and Dongtinghu, all the rest have been completely separated from the Changjiang, causing the amount of resources of black carp, grass carp, silver carp, big head carp, common carp, and phrynosoma to decrease, while the proportion of silverfish, longtailed anchovy and lake shrimps and similar small fish and shrimps have increased.

3. Massive encirclement of the lakes to create fields has caused the area of water to shrink. Aquatic plants have been destroyed. The spawning and growing grounds of certain fish (such as areas banking lakes where aquatic weeds and grasses grow abundantly and are grounds for the common carp and the gold carp to spawn glutinous rice and grow) have been destroyed. At the same time, the water storage of lakes and the ability of the lakes to regulate the surrounding environment and climate have decreased. According to preliminary statistics, the nation's lakes cover over 20 million mu in area. In 1957, our nation's largest lake, Boyanghu, covered 7.15 million mu. Now, 1.3 million mu have been encircled. The original area of 780,000 mu of water for fish propagation has been reduced by half. On the 31 southern spawning grounds of the common carp, eight have been destroyed and 11 have been affected.

4. Because of industrial development, massive amounts of industrial waste fluids have not been treated before they were drained into rivers, lakes and seas. With the additional effects of petroleum and farm chemicals, the pollution of bodies of water is becoming more and more serious. The increase in the poisonous contents of heavy metals, cyanogen and benzene in bodies of water has directly affected the propagation of organisms for bait and fish and has caused fish to die in partially and seriously affected areas. The western Shanghai drainage system of the Shanghai segment of the Changjiang drains over 700,000 tons of waste water a day. The drained waste water forms a polluted belt several dozen meters wide and extends over 10 kilometers. It affects migration and reproduction of fish and causes mullet and eels to die en masse. Fish have a great ability to amass some poisonous substances. Via the food chain, the content of remnant poison in many aquatic products greatly surpasses the concentration in the body of water. In the Zhaoyuanjiang section of Songhuajiang, 60 percent of the fish contain mercury surpassing the 0.3 milligram/jin health standard for foodstuff. The highest content has reached 2.68 milligram/jin, directly harming people's physical health.

## Strengthen Environmental Protection for Fishery

Environmental protection of fishery is an old problem and also a new topic. It is attracting increasing concern and attention. Since the founding of the nation, through massive surveys and studies, laws concerning protection have been drafted and certain measures of control have been taken and definite results have been achieved. But environmental protection for fishery is a broad issue, the situation is complex, and each department must coordinate with others. In the future, propaganda should be further strengthened to increase understanding of the important significance of environmental protection for fishery, conscientiously and thoroughly implement "the regulations for the protection of aquatic resources and fish propagation," "standards of water quality for fishery" and such regulations, strengthen comprehensive research of ecological systems in water regions, and establish some necessary specialized agencies to undertake environmental protection and management for fishery as a routine matter. At present, in view of the situation and the cause of destruction of our nation's fishery environment and fishery resources, the following work must be urgently done well.

1. When constructing water conservancy projects, blocking rivers and building dams, cutting off rivers and intercepting river flow, the protection of fishery environments and fishery resources must be taken into consideration. Corresponding measures to save the fish must be taken. At floodgates and dams that have already been built, where conditions are good, passages for fish must be added. Practice shows that building passages for fish while constructing floodgates and dams on migratory passages of some fish is an effective measure. Since the founding of the nation, our nation has built over 30 passages for fish. Of the more than 90 large and medium-sized floodgates and dams along rivers and near the sea in Jiangsu Province, there are 24 passages for fish. They have provided a definite benefit in assuring migration of fish and reviving fishery resources. After the fish passage of the Taibenzha in the Yangzhou region was opened in 1973, the results of fish passage have been good. Each year in April and May, large schools of eels and phrynosoma fry pass through and swim upstream to the lake to grow. Over only several years have various types of migratory fish emerged again in the Shaobehu and Gaobaohu at the upper reaches of the dam. Fishery production has increased on a large scale. In 1974 the total production of fishery of the four counties banking the lakes increased by over 2.7 million jin compared to 1972. The production of phrynosoma increased over 1.93 million jin.

The Gezhou Dam water conservancy hub presently being built will cut the Changjiang in half and will hinder the migration of sturgeons upstream for reproduction and destroy the largest spawning grounds of the four major species of black carp, grass carp, silver carp, and big head carp in the Changjiang. The flow of the river will be intercepted this year. According to information sources, concerned departments are still using all kinds of reasons to refuse to build passages for fish. This will seriously destroy the fishery resources of the Changjiang. The sturgeon and the Chinese paddlefish, which are key species being protected in our nation, will face the danger of extinction.

2. Encirclement of lakes to create farmland and filling in of ponds to plant food grains must be strictly prohibited. Fields already encircled and reclaimed but not producing sufficient crops must be returned to lakes in order to maintain the ecological balance of the lakes. Encircling the sea to create farmland must be carried out by suiting measures to local circumstances, by making overall plans and taking all factors into consideration. The principle of not destroying fishery environments and fishery resources should be followed. The grounds for the young and the fry of shellfish in beaches, grounds for fish culture and spawning grounds for coastal economic fish and shrimp, and grounds for bait must all be strictly protected. For example, the types of aquatic life of the coastal beaches of northern Jiangsu are special, the region is a centralized area producing clams. The shallow sea is also an important spawning ground of little yellow croaker, butterfish and Chinese herring, and it should be strictly protected.

3. The concerned departments must strengthen management and control of the "three wastes" to prevent harmful waste water from polluting water regions. Each region can strengthen the survey and monitoring of pollution of fishery environments according to the requirements of the "standards for water quality for fishery" and propose active preventive and control measures. As long as the leadership in each department emphasizes the problem and implements measures forcefully, the problem of pollution of water regions can be gradually solved. For example, the Guanting river system was originally affected by drainage of harmful waste water from the upper reaches and surrounding factories. The water quality worsened and massive amounts of fish died, attracting the attention of the leadership of the concerned departments in Beijing, Tianjin, Hebei and Shanxi. Starting in 1972, control of the "three wastes" has been actively carried out and good results have been obtained. At present, 30 percent of the total amount of harmful waste water can be retrieved along the entire river valley for purification treatment. The release of harmful substances of phenol, cyanogen, arsenic, chromium, benzene and DDT has been reduced by 53 percent. The water quality has greatly improved and the growth of fish is good.

#### 4. Strengthen the Survey and Study of Fishery Environments and Fishery Resources

Since the founding of the nation, relatively large-scale surveys of fishery resources have been conducted within the nation, but the work is still not sufficiently deep and systematic. In the future, survey and research of the mutual relationship between ecological environments of fishery and fishery resources should be strengthened. The reserve of major economic fish species must be clearly surveyed, ways to maintain the ecological balance in water regions must be explored, and plans and measures to protect fishery environments and to develop and utilize fishery resources rationally must be drawn up. At the same time, comprehensive scientific surveys of the areas designated for the protection of nature must be launched in a big way. Our nation has many famous and precious aquatic animals, such as the lipotes vexillifer, the Chinese alligator, the lancelet, the dugong, the large salamander and the sturgeon. Because they were not protected for a long time, some species are near extinction. The urgent task at present is to examine carefully within a short period the distribution and number of precious aquatic animals and the ecological and environmental conditions of their living and reproductive areas, examine carefully the environmental conditions and resources of representative and typical ecological systems of water regions, determine key targets for protection, and zone new areas for the protection of nature to push the entire work of protecting nature forward.

PEOPLE'S REPUBLIC OF CHINA

FORESTRY DEVELOPMENT IN PROCESS

SK291304 Xining Qinghai Provincial Service in Mandarin 2330 GMT 28 May 81

[Report on QINGHAI RIBAO 29 May article by Liang Buting: "Developing Forestry Is a Strategic Task"]

[Summary] "In the first part of the article, Comrade Liang Buting dwells on the important status of forestry in the national economy and the relations between forestry and agriculture and animal husbandry. He discusses the process of mankind's understanding of forests in his article."

The article states that since liberation, Qinghai Province has scored achievements in forestry. However, the backwardness in forestry development is still grave in the province, bringing many detrimental effects to agriculture, animal husbandry and the people. The main reason for this is that forestry has long been neglected, the responsibility system in forestry production has not been well implemented and people have failed to adhere to the principle of taking afforestation as the foundation. Most people have failed to earnestly carry out afforestation according to economic laws, are divorced from the masses and have neglected tree-planting and forest management. The shortage of forestry funds and technical personnel is also a cause of our province's backward forestry development. These problems have damped the enthusiasm of the masses and the people of all quarters in afforestation and sapling cultivation, hindering forestry development.

In the article, Comrade Liang Buting says that to advance forestry, we must solve ideological problems. First, we must soberly appraise people's understanding of insufficient forestry development. We must realize the urgency of this work and have a high sense of responsibility. Second, we must recognize the need to create new forests since they can easily be destroyed but are hard to reconstruct. We must correctly handle the relationship between our immediate interests and the long-term interests and foster the ideology of constructing forests on a long-term basis. Third, we must realize that the three-in-one combination of agriculture, animal husbandry and forestry is one of the characteristics of modernized farming in China and that protecting forests and developing forestry is very important.

Liang Buting says we now confront two problems in our province's forestry development: how to protect existing forest resources and how to develop forest resources and carry out afforestation. These are the basic ways to improve our province's backward situation in forestry development. To fulfill these tasks, we must rely on policies and scientific methods. In short, we must rely on the wisdom and strength of the people of various nationalities throughout the province.

In the last part of the article, Comrade Liang Buting offers many concrete suggestions on solving the ideological problems of leadership at all levels, enforcing forestry policies and carrying out afforestation according to local conditions.

CSO: 5000/2126

PEOPLE'S REPUBLIC OF CHINA

BRIEFS

POLLUTION ELIMINATION--In this period of national economic adjustment, the Tianjin Chemical Plant devotes itself to increasing production and eliminating pollution. Compared with 1976, the number of items of pollution control in that plant has been increased about 30 percent in 4 years. The yearly discharges of 3 wastes are reduced about 50 percent while the reclaimed products are worth more than 1.2 million yuan. The newly completed 34 metal anode mercury electrolysis tanks which will reduce pollution are currently China's largest and most advanced chlorination equipment, which will reduce energy consumption, prolong the useful life of the equipment, and reduce labor intensity; most importantly it will make the mercury vapor content of the air in the plant reach, basically, the standard of the state. This item is constructed with the capital invested by the state. In the construction process, the plant received the concern and guidance from the city of Tianjin and the people's government of Hangu District. The Tianjin Chemical Plant eagerly implemented environmental protection regulations of the local government. The plant director, Fu Qinghe [0265 1987 0735], actively contacted related departments many times to make certain their concrete methods of execution would promote the work of the industry in furthering environmental protection. In order to catch up with the advanced level of the world and more or less eliminate mercury pollution, the plant's scientific and technical staff worked long and hard and succeeded, most recently, in experimenting with the new technique of "closed cycle" for preventing mercury pollution. Currently, they are struggling to apply it in production at the earliest possible date. In practicing pollution control, the production of Tianjin Chemical Plant had not been adversely affected; it was in fact promoted. In these 4 years, the capital used in pollution control amounted to 11.7 percent the plant's own capital. As the labor condition was improving, the production efficiency obviously increased. The production of every one of these years exceeded the required quota.  
[Text] [Beijing GUANGMING RIBAO in Chinese 28 Apr 81 p 1] 6168

REGULATIONS FOR ENVIRONMENTAL CONTROL--Most recently, the Standing Committee of the Ninth Tianjin Municipal People's Congress held its eighth conference to pass the three local regulations of "The Temporary Rules for Protecting the Water Systems Within the City Limits of Tianjin," "The Temporary Methods of Charges and Penalties of Tianjin City for Excessive Discharge of Pollutants," and "Temporary Rules of Controlling Noises in Tianjin City." These are to be announced and executed by the municipal people's government. Tianjin is an old industrial city. On the historical foundation, and the added agricultural and industrial development since the establishment of the nation, the problem of environmental pollution became increasingly

obvious. For the purpose of reasonable utilization of the natural environment, prevention of pollution, preservation of the ecological balance, and providing the people a clean and suitable environment for living and working, the Standing Committee of the Tianjin Municipal People's Congress, based upon "The Chinese People's Republic Environmental Protection Law (Trial Implementation)" and related regulations, formulated these three local regulations, after consideration of the concrete condition of the city, discussions with the municipal people's government and related departments, and through a relatively long period of deliberations, extensive consultations, and repeated revisions. These three regulations are the first group of local rules passed by the Standing Committee of Tianjin Municipal People's Congress. After these are implemented, they will have a great effect on improving the environment, controlling pollution, as well as strengthening the concept of the legal system among the masses. [Text] [Beijing GUANGMING RIBAO in Chinese 28 Apr 81 p 1] 6168

ENVIRONMENTAL ENGINEERING SOCIETY--The Environmental Engineering Society of the Chinese Environmental Science Association held its inaugural ceremony 18-24 March 1981 in Jinan where it elected the members of its leadership organ, passed its constitution and drew up a plan of activities for the coming 2 years. Environmental engineering, a new comprehensive science, is a vital part of environmental science. It studies the technological principles and methods of applying engineering measures to improve environmental quality, to control pollution and to protect the environment. More than 170 specialists who attended the meeting agree that during the readjustment of the national economy the research objectives of environmental engineering must be in keeping with the environmental protection work of our country. Major emphasis should be placed on massive, extensive, inexpensive and effective engineering measures which do well in pollution control and environmental protection. [Text] [Beijing GUANGMING RIBAO in Chinese 3 May 81 p 2] 5360

ELIMINATION OF SMOKE AND DUST--The Tianjin Chemical Factory which had improved its furnace and strengthened its operations and management scientifically is now able to eliminate smoke and dust and run its production with less coal. Previously its furnace room used to be a hot, smoke-filled and unhealthy place to work. Outside the furnace room one saw nothing but black smoke and falling coal dust. It wasted fuel and polluted the environment. The workers and the masses in the vicinity were so fed up with the situation that they called it a place full of "false cloudy days" and a "downpour of dark snow." Using what it had on hand, the factory improved the structure of its furnace to eliminate dust by means of a tight seal to keep out dust and water to rinse away dirt. As it reinforced its operations and management scientifically, it has come up with a "thinner, faster, milder" readjustment procedure (a thinner layer of coal, greater speed and a milder air blast). This helps the furnace generate a stronger force, faster and at a lower cost, eliminate smoke and dust and improve environmental quality. Now, the furnace room is so bright and clean that the production conditions have become much more civil. The chimneys both inside and outside the factory have stopped emitting black smoke. It is now able to eliminate as much dust as required by the state and reach for more advanced levels in other economic areas as compared with similar factories in the country. [Text] [Beijing GUANGMING RIBAO in Chinese 3 May 81 p 2] 5360

SHANDONG AFFORESTATION--Since spring, Shandong Province has afforested 760,000 mu of land, built and improved 2.5 million mu of farmland forestry networks and planted 210 million trees in areas near houses, villages and by roadsides and the waterfront. [Jinan Shandong Provincial Service in Mandarin 2300 GMT 14 May 81 SK]

SHAANXI AFFORESTATION--Shaanxi Province had afforested 3.68 million mu of land by end of April, or 11.9 percent more than the annual afforestation plan. Some 1.53 million mu of afforested land falls within the Sanbei forest belt. Presently, the various localities are organizing manpower to strengthen management and protection of forests. [Beijing Domestic Service in Mandarin 0400 GMT 16 May 81 OW]

GUANGDONG ENVIRONMENTAL PROTECTION FORUM--Recently, the Guangdong Provincial Environmental Protection Bureau held a forum on protecting the environment in the province. It was proposed that the leadership of Guangzhou follow the four directives of the central secretariat on building in the capital. It is necessary to organize and mobilize all trades and professions to adopt effective measures to improve the appearance of Guangzhou within 3 to 5 years. The relevant departments of the province must actively support the environmental protection work of Guangzhou. The participants also pointed out that it is necessary to further strengthen the leadership over environmental protection work. [HK071240 Guangzhou Guangdong Provincial Service in Mandarin 2330 GMT 30 Apr 81]

FUJIAN ENVIRONMENTAL SCIENCE--The Fujian Provincial Environmental Science Society held its first congress in Fuzhou 15-18 May, attended by more than 150 environmental scientists, professors, engineers and environmental control cadres. The congress elected the society's first council, adopted a constitution and exchanged more than 60 theses. Li Chaobo, vice minister in charge of the State Capital Construction Commission, director of the Office of the State Council Environmental Protection Leading Group and chairman of the China Environmental Science Society, attended and addressed the congress. [OW280327 Fuzhou Fujian Provincial Service in Mandarin 1035 GMT 19 May 81]

CSO: 5000/4071

**GUIDELINES FOR REFORESTATION IN DRY ZONE**

Colombo SUN in English 20 May 81 p 6

[Article by Feizal Samath]

[Text] Around two million acres of chena land in the country's dry zone will be handed over to the private sector for reforestation, under a massive scheme drawn up by the Ministry of Lands and Land Development in consultation with the Forest Department.

A draft agreement between the Forest Department acting on behalf of the government and the prospective developer has been prepared by the ministry and is being examined by the Attorney-General's office.

It has been titled the Forest Department aorestation and utilisation agreement.

According to the guidelines laid down, it is proposed that these lands b- given to individual firms and state organisations for reforestation on a yield sharing basis--30 per cent to the government and 70 per cent to the developer.

The department will enter into a long term management (30 years) with the prospective developer, during which period the land will remain a property of the state. Compensation will be paid to the developer in the event of the agreement being terminated at the instance of government.

The land will be allocated in blocks ranging from 50 acres to 200 acres, according to the investment capacity of the developer. The Land Ceiling Act will not apply in this instance, as the ownership will be retained by the state.

The cost of clearing, land preparation, fertilizing, aorestation and maintenance per acre is approximately estimated at Rs 3,000. The department will provide technical advice, supervision of forest plantations and also ensure that conditions in the agreement are successfully carried out.

The developer is free to inter-cultivate and carry out other agricultural activities such as animal husbandry and poultry farming in addition to reforestation, provided such activities do not interfere with tree growth.

The developer will not be entitled to an income from such operations, according to the guidelines.

From the seventh year onwards, the developer may be in a position to receive an income from planting short term fuelwood, etc. Tax rebates will be made available to the developer from the normal income.

The developer is expected to commence work in 1981. Every effort will be made to select lands and hand them over to developers after obtaining clearance from the respective authorities, that the land selected will not be required for any other development purposes during the period of the agreement.

CSO: \$000

PETROCHEMICAL WORKERS CONTAMINATED BY MERCURY COMPLAIN

Caracas EL NACIONAL in Spanish 14 Apr 81 p C-2

[Article by Ojeda Garcia]

[Text] San Felipe, 13 Apr--A group of former employees of the chloro-soda plant of Moron who have been subjected to mercury poisoning have addressed to Oscar Celli, deputy in the Venezuelan Congress, a letter which they wish to have made public through EL NACIONAL.

Former workers Manuel Villanueva, Antonio Medina and Marcos Ramirez say that in the letter, which is signed unanimously by the Committee for Protection Against Industrial and Environmental Contamination, they are asking for justice in the handling of their problem, the chronic mercury poisoning of a large segment of the Venezuelan population, principally of former workers at the Petroquimica de Moro. The letter in question is dated 30 March 1981 and says, among other things, the following:

"The contamination by mercury of this central shore was caused by the chloro-soda plant (IVP) [Instituto Venezolano de Petroquimica] which has been dismantled but the deadly poisoning has continued, not only of the former workers of that plant, but also of the entire population and the environment in general through the mercury deposits in the gypsum pond and Cano Alpargaton.

"There are cases of contamination among the population. Newborn babies have already appeared affected by mercury, with problems of the umbilical cord which are caused by this poison. It is essential that this should be treated as a serious matter and with a Venezuelan sense of responsibility so that a careful investigation may be made. The absurd negative attitude of the company must cease, and the minister of environment must express concern over this problem, which the Japanese, with over 30 years of experience, have not been able to solve; meanwhile the evil spreads implacably.

"For us who have been injured by direct contact with mercury vapor it would mean very little, but it would mean much to future generations because if the damage is not checked this country will in the future be a sick, weak nation with stupid inhabitants who are useless for its development. We do not know what the minister of intelligence, who is carrying on a national crusade, will think, when here,

in the center of the country, we have this blemish. If it is not corrected in time we will have to build many psychiatric institutions to shelter great numbers of young people who will be mentally unbalanced.

"The first known cases are already appearing. How many more children may have been born with similar damage without it being detected! This must be given priority; to deny or delay it would be treason to our country. We have the case of a woman who had to have a Caesarian in order to save the baby. This woman had the operation performed at a private clinic where she had to pay 8,000 bolivars for it. The doctor asked her if she had worked for Petroquimica or if she drank a lot of coconut water, lemon water and so forth. The doctor told her that the umbilical cord had developed to only 35 centimeters in length and that that was caused by mercury. He had previously detected four or five cases which he had not publicized in order to avoid trouble. Imagine how many similar cases must have occurred at all levels without it being known. We are already reaching the time when it will be obligatory for all the young people of the area to be carefully examined for mercury contamination before marrying so that future generations will not be born suffering from mercury poisoning.

"Since 1979 we have been complaining about this to the president of the republic, the Attorney General's Office, the National Congress and other official agencies which are concerned with these matters and have received little attention and dubious interest on the part of these authorities.

"We have sent Congress the report on the compensation which the enterprise or the state have the moral or legal obligation to pay for the harm done to the former employees. We have asked the Specialized Health Center for the diagnosis not only of mercury poisoning but also for lead and other heavy metal poisoning. We are grateful for the fact that through its intervention the case has been carried to the National Congress for consideration and immediate discussion on a priority basis, since it involves serious poisoning which harms the community. This problem has been channeled through a commission of social affairs which is headed by Deputy Eloy Torres, but this revolutionary, since he has become accustomed to the good life, has forgotten his commitments to the people since he is tabling the INTEVEP [Venezuelan Institute of Petroleum Technology] report without processing it; meanwhile the damage is progressing."

They conclude by saying: "It is a disgrace that a country as rich as this, where so much money is squandered, should compromise its future for such a trifle."

Signed: Victor Urquiola, Manuel Dominguez, Marcos Ramirez, Rafael Pineda, Juan Reyes, Manuel Villaro, Antonio Medina, Manuel Villanueva and German Pulgar.

7/2/84

CSO: 5000/2114

ZAIRE

BRIEFS

CONCERN ON SHABA DESERTIFICATION--"Is the way being paved in Shaba for another Kalahari?" That is the question asked by MWANA SHABA, the bimonthly newspaper of the GECAMINES [General Quarries and Mines Company] which, in an interesting commentary, shows concern over the excessive deforestation of the Shaba savannas by peasants who are transforming the surroundings of the mining towns, in particular those of southern Shaba. At the rate that things are going, the way unquestionably is being paved for another veritable Kalahari, adding that it is high time for the regional and sub-regional authorities to take steps without further delay. The GECAMINES newspaper had many times proposed the solution that Luena coal be used as a replacement, all the more since the people have been using it for several decades as a source of energy, coal that is cleaned and striated in the Luena GECAMINES installations. It also called for willingness on the part of everyone not to strip their ecological source. It wrote in substance that schools and youth programs can find in the examples of other countries an advantageous source of inspiration, such as Russia, which became one of the most forested countries in the world after having experienced the same calamities. In addition to the effort to be made by the Shaba authorities, concluded the commentary of MWANA SHABA, the departments of environment and the preservation of nature, of tourism, of agriculture, and of primary and secondary education have a great deal of work to do in intervening as quickly as possible. [Text] [Kinshasa ELIMA in French 16 Apr 81 pp 1, 7] 8255

CSO: 5000/5013

## CHIKWARAKWARA IRRIGATION SCHEME REVIVED

Salisbury THE HERALD in English 27 May 81 p 13

[Text]

## BULAWAYO.

"THE Chikwarakwara Irrigation Committee was formed while we were still in the keep (protected village). It was formed after starvation had killed many of our people.

"Every day we were burying three, four or sometimes five dead as a result of hunger," committee chairman, Mr Leader Sithole, said as he sat on the edge of a freshly repaired canal.

About 50 metres away a workforce of eight was busy making mounds of earth along the edges of a war-damaged canal. "The Rhodesian soldiers destroyed our cattle during the war. Today we have practically no cattle at all. We have an irrigation scheme but no means of tilling the soil."

Chikwarakwara Irrigation Scheme, about 115 km east of Beltrbridge, is being revived at the peasants' initiative. The population is more than 1 000 but the scheme is being staffed again by about 60 people under the leadership of the Irrigation Committee.

"Although we have left the keep we are still far from overcoming starvation in this area. We left the keep with practically nothing," Mr Sithole added.

Committee member, Mrs M. Makasene and headman M. Mpakanase Chikwarakwara agreed.

"We still need a lot of help here. We have the irrigation scheme but have no seeds, no fertiliser and no farming implements", said Mrs Makasene. "We are all ready to get this scheme on the go."

Mr Chikwarakwara was asked if Government services to his people would not be more effective if they lived in a group. He said his people were already living in a well-defined area.

"As a rule any peasant wishing to farm on this irrigation scheme must first register to live right here," he added.

Signs of Government interest in helping the people were already evident.

The three engines for pumping water had been repaired. A young extension assistant, Mr C. Dube, had been sent to the area a few days earlier. The school had been promised \$1 500 from the Zimcoord fund.

Mr Dube said: "As long as I am here I am going to see to it that proper methods of ploughing and planting are carried out."

Chikwarakwara school headmaster, Mr R. M. Magudu, said the lack of a clinic, poor drinking water

and inadequate food were having an adverse effect on the students.

"On some days we had to send home between 15 and 30 students because of poor health or hunger. Their parents came out of the war poorer than ever. We could not force the parents to buy uniforms for the students."

Chikwarakwara students come from as far as 40 km away. They use the deserted keeps as temporary shelter during the weekdays and return to their homes on weekends.

As I was being shown around the irrigation scheme sporadic shots across the border could be heard. "Those are South African soldiers practising".

Mrs Makasene had said earlier: "Sometimes their shells land here. Some time ago a bomb fell right in the middle of that field", she said pointing to a grass covered area.

A Zimbabwe National Army soldier told of South African soldiers monitoring movements on the irrigation scheme from across the Limpopo border.

"They believe this place is a crossing point for ANC people", he said, adding that they were likely to shoot from across the border at any unusual figures.

CSO: 5000

BASE FOR ESTONIAN ENVIRONMENTAL PROTECTION WORK DESCRIBED

Tallinn SOVETSKAYA ESTONIYA in Russian 19 Mar 81 p 2

[Article by M. Kaazik, head of department of environmental protection of the ESSR Gosplan: "Base for Further Work"]

[Text] During the 10th Five-Year Plan, the republic implemented a broad set of legal, organizational and technical measures to solve environmental protection problems. The following laws of the Estonian SSR were adopted: "Code on Mineral Resources of the ESSR," "Code on Forests of the ESSR," as well as a number of decrees: on questions of intensifying protection of the Baltic Sea basin from pollution, on additional measures to intensify protection of nature in the republic, on the protection of rivers, on expanding the preserve territories, and other documents. They state the legal questions and raise specific tasks to intensify activity for environmental protection and the efficient use of natural resources.

In the Main Directions adopted by the 26th CPSU Congress, continuation of this work is stipulated. It is stated there: "Develop work to create and perfect a system of cadasters of natural resources, and to perfect the state control over use of nature and environmental protection." State planning that since 1974 has been in a special section in the national economic plan, will play an important role in controlling the use of nature. The 10th Five-Year Plan was essentially the first planned five-year plan of environmental protection during which the actual system of planning was perfected at all of its levels. At the same time, state statistical accounting was set up for fulfillment of the environmental protection assignments and plans.

It should be said that the resolution of many environmental protection problems, in light of the enormous quantity of data, is unthinkable without the use of computers. The computer center of the ESSR Gosplan will therefore be more involved in resolving these problems. Now only individual problems are solved on the computer. It is planned in the future to gradually increase the data bank at our computer center for environmental protection and natural resources.

The Main Directions indicate the need to accelerate construction of water protection facilities in the Baltic Sea basin. In the last five-year plan, a lot of work was done in this area. The republic built 270 biological treatment works. Large wastewater treatment works were put into operation in Tallinn, Kokhtla-Yarve, Pyarnu, Valga, Yygeva, Kiviyl, Keyla, Elva, as well as in the settlements of Kekhra (first phase), Yarvakandri, Mar'yamaa, Puurmani and Vyzu.

The tasks of protecting water resources follow from the decree of the Estonian SSR Council of Ministers "On Measures to Increase Protection of the Baltic Sea Basin from Pollution." It obliges the ministries, departments and enterprises of union subordination to formulate and implement a set of measures so that by 1985, the discharge of untreated waste water into the reservoirs is completely halted, and it was stipulated that this work end by 1981 for 10 cities, 2 urban settlements and 32 industrial enterprises and associations.

On the background of the broad front of planned water protection measures, it is impossible not to note that the plans for building waste water treatment works for 1976-1980 were not fulfilled on the whole each year. For these facilities, about 16 million rubles of state capital investments remained underutilized, including 12 million rubles allocated for construction-installation work. As a result of this, a number of measures were not fulfilled by the set schedule, 1981 and were carried over to the 11th Five-Year Plan. This places serious problems before the purchasers' of the water protection facility construction sites and the contracting construction organizations to fulfill the governmental decree on halting the discharge of untreated wastes by 1985. At the same time, requirements are increased for the quality of the planning documents and the production of construction work, as well as for the operation of the treatment equipment.

The Main Directions state: "Extensively use the complex refining of raw materials, resource conserving equipment, low-waste and waste-free technology, in every possible way involve local types of raw material and materials in the turnover, and recover secondary resources." Consequently, we are concerned here with the main directions not only of environmental protection work, but also strengthening the resource and economic potential of the national economy in general.

In designing any production facility, environmental protection must begin with the selection of the most optimal technological version with the maximum recovery of wastes. With this solution to the problem, the expenditures for building treatment works are also greatly diminished.

The enterprises of the food, meat-dairy and fish industry form effluent with a large protein and fat content. Its treatment requires the construction of expensive structures. For example, the treatment works of the Vykhma meat kombinat cost almost R 1.5 million. According to preliminary calculations, the construction of biological treatment works for the wastes of starch production would cost almost R 6 million. This is more than 10 times greater than the cost of the main fund of shops of starch production. It is clear that in this case this is not economically profitable. Consequently, versions will be more correct that provide for separation and recovery of the cellular juice that is the main source of effluent pollution. As a result of experiments conducted by specialists of the Tallinn Polytechnical Institute in the "Payuzi" kolkhoz, it has been established that with single separation of the potato mass, up to 60% of the cellular juice can be separated, and with double, up to 90%. The remaining part of the pollution can be easily removed after simple biological treatment. The effect of the suggested version is increased even more if the production of nutrient yeast is set up on the basis of the obtained cellular juice.

In a word, there is still something for the scientists, engineering planners and technologists to work on.

One of the most important environmental protection tasks in our republic is prevention of pollution of the environment with wastes of petroleum products and oils that are formed in many spheres of economic activity, as well as during their storage and transporting. According to the established order, the wastes must be sent to the bulk plants for further shipment to oil refineries for regeneration. But sometimes wastes are formed that in their composition cannot be accepted by the bulk plants, for example, the wastes with a high content of solid admixtures, different chemical compounds and water, and the precipitate formed in the tanks and vessels for fuel. At times these are petroleum products of unsuitable quality or soil polluted with petroleum products, sawdust, peat, etc. Precisely this portion of the petroleum product wastes represent the greatest potential danger for nature.

It is known, for example, that 1 liter of petroleum products can pollute up to 1 million liters of water. Moreover, in dumping these wastes we lose a definite quantity of valuable petroleum products for the national economy, and at the same time, heat.

For a long time these wastes were simply hauled to the dump and to spent quarries where they were burned. However, it was soon established that with an addition of fuel, they burn poorly and their remaining part begins to penetrate to the underground waters.

Starting in 1976, therefore, under the general supervision of the ESSR Gosplan, systematic searches were started in the republic to solve these problems. The workers of the EstNIINTI [Estonian Scientific Research Institute of Scientific Technical Information and Technical Economic Studies], specialists of the Tartu State University, and the Institute of Thermophysics and Electrophysics of the ESSR Academy of Sciences were involved in this study. Although by now all the technical problems associated with recovery of these wastes have not yet been definitively resolved, one can note with satisfaction that a number of practical recommendations have already been introduced. Here I would like to make special note of the initiative of the fishing kolkhozes "Pyarnu Kalur" and "Lyaene Kalur" where highly efficient works have already been built to treat bilge water that were formulated by the specialists of the Tartu State University. In addition, the state planning institute "Estpromprojekt" has developed a technical draft for an experimental unit to process and burn liquid fuel wastes. The unit will be built in the Mustamyaeksiy boiler house. Based on its experimental operation, analogous units will be constructed in the future in other cities.

The ministries, departments, as well as the enterprises of union subordination should not wait until someone definitively solves all the problems of eliminating these wastes. Without delay, they themselves should actively start studying the reasons for their emergence and try to eliminate them with the help of suitable versions of already available technical solutions. Many of them can be introduced by the forces and means of the repair-mechanical workshops of the enterprises.

The Main Directions state: "Perfect the technological processes in order to curtail the discharges of harmful substances into the atmosphere and improve the treatment of exhausts from harmful admixtures."

For the purposes of protecting the atmospheric air, during the 10th Five-Year Plan electric filters of the TETs "Akhtme" were put into operation. The electric filters at the Baltic and Estonian GRES's were updated. A unit was built to purify generator gas of hydrogen sulfide and a unit to purify the heavy coal-tar products in the production association "Slantsekhim." At the cement plant "Punane Kunda," work is continuing to install electric filters. Tartu has good prerequisites for a significant sanitation of the atmospheric air by switching to combustion of natural gas. In addition, the bridge to be built over the Emayygi will permit concentration of the transportation traffic in the central part of the city and at the same time reduce air pollution from automobile exhausts.

In Tallinn, air pollution on individual streets sometimes exceeds the permissible norms. This is because of the presence in the city of a large number of boiler houses (over 800 units) and automobiles. It also indicates the unsatisfactory fulfillment of environmental protection measures, in the first place at the V. Kingisepp Pulp and Paper Plant, the Maardu Chemical Plant and the production association "Silikat."

In conclusion it is necessary to note that during the 10th Five-Year Plan, a good base was set up in the republic for a further improvement in the work of environmental protection and successful resolution of the tasks of the 11th Five-Year Plan in this area.

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USSR

## BELORUSSIA TAKES STEPS TO PROTECT ITS SEA WATER SOURCES

Minsk SOVETSKAYA BELORUSSIYA in Russian 29 Mar 81 p 4

[Article recorded by Yuriy Sapozhkov: "Sea Problems of Belorussia"]

[Text] As is known, Belorussia does not have sea boundaries. It is about 400 kilometers from the Baltic Sea, and almost 1500 from the Black Sea. Nevertheless, the republic is involved in problems associated with these seas.

APN [Novosti Press Agency] correspondent Yuriy Sapozhkov asked the chairman of the BSSR State Committee on Environmental Protection V. D. Kozlov to discuss them.

"Belorussia is a particularly continental kray; however, it has the most direct relationship to the Black and Baltic Seas. The fact is," says V. Kozlov, "that the watershed of these two seas passes through the territory of our republic on the Orsha and Minsk elevations and in the northwest environs of Poles'ye. Some water from it runs into the Baltic Sea, and some into the Black Sea."

It is quite clear that the purity and high water level of the Baltic and Black Seas depends on the sanitary condition of their basins.

The Belorussian scientists have compiled a "Prediction for the Efficient Use and Protection of the Water Resources of Belorussia to the Year 2000." One of the important conclusions of this major work was the need to control the regime of the rivers by redistributing their water reserves through linking systems, by creating artificial reservoirs and canals, and as a result, a unified water management complex for the BSSR. The fullest northern and western rivers of Belorussia that generously feed the Baltic sea, will have to become "donors" of the Black Sea in order to save it from the powerful flow of mineralized waters from the Atlantic Ocean. The already built Vileyka-Minsk aqueduct already serves this purpose. It tripled the water budget of Svisloch' and the right tributary of the Berezina that enters the Dnieper. An automated system has been set up on the Dnieper to control the transfer into it of the channel of water from the northwest and west rivers. In the opinion of the specialists, the run-off into the Black Sea will double.

The problem of the Black Sea unexpectedly came together with the problem of the Belorussian Poles'ye. This kray of impassable swamps stretches along the river Prinyat' for 450 kilometers. Poles'ye can only be made suitable for living

and economic activity if the swamped lands are dessicated. But simple dessication may have a negative effect on the "welfare" of the Black Sea because it significantly reduces the influx of Poles'ye water. A solution was found in the construction of double action land reclamation systems where water does not run off from the fields, but is collected in artificial lakes from which it is supplied for irrigation. The dams built along the Prinyat' make it possible to hold about 3 cubic kilometers of water in the reservoirs of its floodplain. This method of accumulating moisture is combined with the creation of a system of vertical and the so-called straight drainage that is new in the world's practice. This guarantees two-way regulation of moisture in the soil. As a result the 2.6-million reclaimed hectares will not disrupt the ecological equilibrium of the enormous natural complex and the vital activity of the Black Sea.

The BSSR Council of Ministers recently examined the question of the fulfillment by the ministries, departments, and ispolkoms of the local soviets of people's deputies of the measures to prevent pollution of rivers and other reservoirs, and the basins of the Black and Baltic Seas. The question concerned the construction of new works for waste water treatment, sewage systems and other water protection facilities. The next step in this direction is the creation at the enterprises where this is possible, of waterless technology of production and 100% transition to the circulating system of water use.

In a word, we are doing everything in order for the Black and Baltic Seas to always have the water budget for Belorussia which averages 57.1 cubic kilometers of water per year.

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MINISTER OUTLINES POLLUTION PREVENTION MEASURES TAKEN IN ALMA-ATA

Alma-Ata KAZAKHSTAN KAYA PRAVDA in Russian 7 Apr 81 p 1

[Article by B. Ivanov, minister of power and electrification of the Kazakh SSR:  
"Light' Cities Must Be Clean"]

[Text] "At some time the Alma-Ata TETs-1 was small and was located on the outskirts of the city. The republic capital has grown since then and has already joined with Alma-Ata 1. The TETs-1 also increased its power. Little by little it became overgrown with new stacks that at one time numbered 11. About 10 years ago, with the arrival in Alma-Ata of the gas main and switching of the power plant to natural gas, the stacks began to disappear. But three of them have remained to this day and continue to emit puffs of black smoke. This is very unpleasant for us, the residents of the adjacent neighborhoods of the Moskovskiy rayon of Alma-Ata.

The law on protecting the atmospheric air has been in effect since January 1981. The 26th CPSU Congress focused a lot of attention on this problem in the Main Directions for the development of the country for the five-year plan and the period to 1990. At the 15th Congress of the Kazakhstan Communist Party, member of the Politburo of the CPSU Central Committee, First Secretary of the Kazakhstan Communist Party Central Committee, Comrade D. A. Kunayev stated directly: 'It is very important to drastically strengthen the fight against pollution of the air basins in the industrial centers, including the republic's capital.'

I would like to know what is being done to fulfill these tasks at the republic heat and electric power stations, in particular at the Alma-Ata TETs-1."

Men'shenin, retired, participant in the Great Patriotic War

Before answering the question of Comrade Men'shenin with specific figures and facts, it is apparently necessary to make the content of these figures more understandable, and for this purpose, to bring the reader into the circle of problems that face our sector in the matter of environmental protection. The

main reference point of this work for us is the requirement written in the Main Directions for development of the country approved by the 26th CPSU Congress: "Perfect the technological processes...in order to reduce emissions of harmful substances into the environment and improve the purification of exhaust gases of harmful admixtures."

The main atmospheric pollutants now are the products of burning organic fuel. Since 30% of it is from power engineering, it is still a powerful source of emissions.

However, the development of power engineering itself is a powerful factor in environmental protection since the transition to "clean" electricity in industry promotes the appearance of waste-free technology and leads to a significant decrease in harmful emissions in many sectors.

Nevertheless, it is understandable that as power engineering develops, the scales of formation of harmful products of fuel combustion inevitably increase. However, their output and discharge into the atmosphere are not the same thing at all. The power engineers place powerful screens to block these substances, ash-trapping units. Where it is possible and economically feasible, they switch to cleaner types of fuel, for example, gas.

In 1970, the output of ash for the power stations as a whole was 5.8 million tons, while 1.15 million were discharged into the atmosphere. It is easy to compute that the efficiency of the ash-trapping units at that time was 80%. Last year, the output of ash from all burned solid fuel was 11.85 million tons, and the discharge was only 0.6 million tons. The efficiency of the ash-trapping was about 95%. In other words, with double the quantity of fuel burned, the emissions, on the contrary, were doubly reduced. How was this done?

Starting in 1968, the Kazakh SSR Ministry of Power and Electrification began a long-term target program for updating the active and newly introduced ash-trapping equipment. During these years, over 120 boiler units of the republic, or about 60% of all the coal-dust boilers were exposed to different types of updating. This increased the efficiency of dust-trapping from 70-85 to 93-96% and the ash discharge from one boiler dropped 2-3-fold.

In order to have a clearer perception whether this is a lot or a little, I will say that if the efficiency of ash-trapping in 1980 was maintained on the 1968 level, then with the extant quantity of fuel burned, the ash discharges would be 8 times greater than the actual.

An especially large amount of effort and resources are spent on protecting the air basin in the large industrial cities with increased level of gas content, such as Alma-Ata, Ust'-Kamenogorsk, Temirtau, Balkhash, and others. The purification units were reconstructed in the first place in precisely the power stations of these cities. Their efficiency has reached 95-97%.

A lot has been done in this respect in the republic's capital. It is in especially complicated meteorological conditions.

After natural gas arrived in the city from Bukhara, all the major and the majority of the small boiler houses in the city were switched to it. In 1971 the Alma-Ata TETs-1 was switched.

The city is rapidly growing however. More people are moving from individual, coal-heated houses to well-appointed communal apartments with steam heating and hot water. The gas consumption for these purposes is therefore continually increasing, reaching the maximum in the winter. The main gas line feeds not only Alma-Ata, but also such large cities as Dzhambul, Chimkent, Tashkent and numerous rural consumers. The gas pipeline throughput is not unlimited and in the winter there is not enough gas. For this reason, a number of boilers of the Alma-Ata TETs-1 have been forced to switch to solid fuel.

Nevertheless, even under these conditions, a lot is being done to reduce the discharges. Six boilers were recently disassembled. Another two will be disassembled in 1982. At the same time, the dust-traps on the operating boilers were updated and their efficiency was brought to 96%. Although this is a very high result for this type of boiler, we do not plan to stop here. We completely share the viewpoint of Comrade Men'shenin that the problem of reducing emissions requires further solution. I can state in this respect that last year the next updating of the ash-traps was done at the power station. Their efficiency is now 98%. This year as compared to last, the ash discharge has already been doubly reduced. Adjustment operations are now being carried out on the ash-traps.

Taking into consideration that the Alma-Ata TETs-1 is located in the central section of the city, and with the extant balance of heat consumption cannot be removed beyond the city limits, while a second heat source on solid fuel, TETS-2 has developed near Alma-Ata, it has become necessary to solve the problem of building a second main gas pipeline.

It should be noted that in the 11th Five-Year Plan our sector has been set new tasks for reducing harmful emissions and sanitizing the environment. We are aimed directly at this by the Main Directions for development of the country approved by the 26th CPSU Congress. For example, in relation to the construction of the powerful Ekipastuz GRES and the new TETs's in different cities that are designed for an annual additional burning of over 70 million tons of high-ash coal, the Kazakh SSR Ministry of Power and Electrification is taking measures to guarantee efficiency of ash-trapping at the TETs to 98-98.5, and at the GRES 99-99.5%. As a result of the planned measures, the gross discharge of ash in 1990 will not exceed the 1980 level. In order to attain this goal, a lot of organizational-technical and scientific-research work is being done: in particular, experimental-industrial tests of a boiler with liquid slag-removal and designing of a boiler with a basically new furnace. The successful resolution of these problems will reduce not only the ash, but also to a great degree, the harmful gas emissions. At the same time, full use of the ash-slag mixture with predetermined properties will be guaranteed in the national economy. We are essentially talking about creating waste-free technology in power engineering.

Upon assignment of the Kazakh SSR Ministry of Power and Electrification, other scientific research work is also being done. It is aimed at reducing the ash-gas emissions both at the active and at the newly designed power stations.

USSR

BRIEFS

MONITORING SEA POLLUTION--Tbilisi--Automatic monitors, systems of special ship-board instruments, are responsible for preserving the cleanliness of the Black Sea. Their series manufacture has been set up in the Tbilisi scientific production association "Analitpribor." The instruments that were developed by the association specialists, determine the presence of petroleum products in the water discharged by the ships with a high degree of precision. If the permissible standards are exceeded, the computer issues an alarm signal. "In the 11th Five-Year Plan, it is planned to equip all long-distance ships of the country's merchant marine with these monitoring systems," stated the general director of "Analitpribor," Z. Kruashvili. "The association plans to develop and produce about 50 different systems and instruments for monitoring the environment." [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 10 Mar 81 p 2] 9035

DUST TRAP--Chelyabinsk--In a minute, 265 cubic meters of air are completely purified of dust in the preparatory mine shafts by a new unit that has been made by the Moscow and Donetsk scientists from the TsNII podzemmash [Central Scientific Research and Planning-Design Institute of Tunneling Machines and Complexes for the Coal, Mining Industries and Underground Construction] and Dongiprouglemash [Donetsk State Planning-Design and Experimental Institute of Coal Machine Construction]. It is important to note that the sanitary-hygienic conditions are drastically improved not only in these shafts but in the adjacent ones and control of the combine is considerably facilitated. The first to test the dust-trapping unit "APU-265" were the miners of the mines "Oktyabr'skaya" and "Kapital'naya" of the association "Chelyabinskugol", in the shafts of the largest section where the suction fan could not "overcome" all the dust. The new unit rapidly cleaned the drift, working with irrigation or dry method. It worked especially well in combination with the local ventilation fan. Upon the recommendation of the inter-departmental commission, the Kopeysk S. M. Kirov Machine Construction Plant has fabricated an adjustable batch of dust-trapping units for different coal basins. [By B. Dmitriyev] [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 24 Apr 81 p 2] 9035

IRKUTSK EARTHQUAKE--Irkutsk--At 11:16 in the evening Moscow time, an underground jolt was felt in Irkutsk with strength of 3-4 points. It did not cause any deaths or damage. According to the data of the Irkutsk seismic station, the epicenter of the earthquake was located in the southern part of Baykal, roughly 100 kilometers from Irkutsk. Here its strength reached 6 points. As the specialists believe, this earthquake was associated with the processes of geological development of the Lake Baykal basin that is a giant fault in the earth's crust. [Text] [TRUD in Russian 12 Mar 81 p 4] 9035

BUSHING GASKETS--Cheboksary, 12 Apr--Concern for the cleanliness of the Volga has dictated certain innovations that it has been decided will be used in the construction of the Cheboksary hydrosystem. The construction site has received the working wheel of the second unit made at the Leningrad Metal Plant. For the first time, polymer gaskets of the working wheel bushings were used. They do not require lubricant. As a result no oil falls into the water. The Volga will be cleaner. [By outside correspondent of PRAVDA Yu. Knyazev] [Text] [Moscow PRAVDA in Russian 13 Apr 81 p 8] 9035

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MERCURY POLLUTION PROBLEM EASED BY NEW PURIFICATION METHOD

Paris 1'USINE NOUVELLE in French 23 Apr 81 p 115

[Article by Elizabeth Gordon: "Mercury Pollution: The Real Protection"]

[Text] The elimination of mercury from waste products remains a real problem in many cases. A new process developed by Fairtec-Sanilo provides a way not only to eliminate this extremely toxic metal, but to recover it in metallic form.

The problem of the treatment of waste products containing mercury as well as copper and zinc arose at the Saft Company Romainville plant. Attempts were made to use ion-exchange resins but, in the case of mercury, there is no easily measurable parameter which can be used to detect saturation of the resin. Furthermore, it is practically impossible to regenerate on an industrial basis. In addition, the fixation capability of the resin used turned out to be lower than the specifications. All these considerations explain why Saft decided to abandon this process.

Fairtec-Sanilo (Suresnes), a company which specializes in anti-pollution systems, was then approached. The result was the development of a physico-chemical process which operates in two steps. In the first step, copper and zinc are precipitated as hydroxides, at a predetermined pH level. The slurries thus obtained are then directed to a treatment center. Once these two metals have been eliminated, the second operation takes place to remove the mercury. It consists in adding sodium borohydride which precipitates mercury in metallic form under tightly controlled conditions. The metallic mercury, which takes less space than the corresponding hydioxide, is then sold to a specialist.

Refined Methods of Analysis Are a Necessity

This process provides very high purification efficiency. Through its use, the residual waste contains less than 1 mg/l copper and zinc, and an average of 50 micrograms of mercury per liter. This level of concentration is not through normal methods, and could even reach levels of 5 micrograms per liter when the installation is complete.

The operation of the treatment plant is automatic, non-continuous, and handles a volume of 5 m<sup>3</sup>/day of waste. Its construction, which was financed by the Agence Financiere de Bassin, is the result of a joint effort by Fairtec-Sanilo,

Saft, which is the first user, and Cevmi Chimie Company which provides the sodium borohydride. This last company participated in the development of the anti-solubilizing medium which, in this particular case, must withstand specific conditions of injection, stirring, decanting, etc.

Saft is very satisfied with this method, while regretting its fairly high cost. The design of the plant raised a few problems, since each type of waste requires specific treatment conditions. But these problems are now resolved. Furthermore, states Armelle Bolognini, the plant manager: "very accurate methods of analysis of the mercury requiring specialized know-how not readily available to all companies are necessary." At any rate, a mercury treatment plant has been operating at Romainville since the beginning of the year and "works very well".

Fairtec-Sanilo has other mercury treatment processes. One of them utilizes a sulfur anti-solubilizing medium which precipitates the mercury, not as a metal, but as a salt. The advantage of the sulfur product is that it can precipitate heavy metals, even in a complex form, for instance in a nitrogen medium. But today, this method cannot be used to recover pure metals.

Daniel Chevalier, an engineer at Fairtec-Danilo, indicates that: "these various physico-chemical processes can be applied to various heavy metals including lead, cadmium or copper. But mercury obviously remains the ideal example, inasmuch as these methods are intended to resolve the difficult cases encountered when processing industrial wastes."

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